

The Role of Structural Barriers in Risky Sexual Behavior, Victimization and Readiness to Change HIV/STI-Related Risk Behavior Among Transgender Women

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Abstract This study examines the role of structural barriers experienced by a community-based sample of 63 HIV-positive and negative transgender women that may elevate HIV infection and transmission risks. Separate hierarchical linear multiple regression analyses tested the association between structural barriers (e.g., unemployment, lack of food, shelter) and condomless anal sex acts, abuse, and readiness to change risk behavior, while controlling for other related factors. Among this primarily Hispanic and African-American sample, HIV-positive and negative transgender women experienced a similar number of structural barriers and experiencing structural barriers was significantly associated with an increased number of condomless anal sex acts ($p = .002$), victimization ($p = .000$) and a decreased readiness to change HIV-related risk behavior ($p = .014$). Structural-level interventions are needed to address this

elevated risk among this underserved and hard-to-reach population.

Keywords Transgender · Structural barriers · HIV · African American · Hispanic · Condom use

Introduction

There exists a lack of uniform data collection on HIV infection among transgender people in the United States. However, reporting of infection rates among this population, primarily by local health departments [1], evidence high rates of HIV infection among transgender women (individuals assigned male at birth who identify and express themselves as women), with an estimated infection rate of 12–28 % [2]. According to one report [3], the percentage of newly identified HIV-positive test results was highest among transgender persons (7.2 %) compared to other groups at risk for HIV, including men who have sex with men (MSM 4.2 %) and serodiscordant partners of people living with HIV (PLWH 4.8 %).

In the US, transgender women can face great risk for HIV because of social oppression, discrimination, and marginalization [4, 5, 6]. Lombardi et al. [7] observed that transgender women report experiencing transphobia, including harassment, violence, and or economic discrimination. Marginalization and other adverse outcomes among transgender women have been reported among transgender women newly diagnosed with HIV in New York City, wherein 51 % had documentation of homelessness, incarceration and sexual abuse, compared to 31 % of non-transgender persons newly diagnosed [1]. Transgender women's experiences with transphobia in structural areas, such as employment, legal recognition,

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and housing, may result in cyclical patterns of poverty and marginalization [4, 8]. Psychosocial challenges associated with marginalization may result in poorer outcomes with regards to education, employment [7, 8] and housing [6]. Transgender women may also face economic strains as a result of costly gender-affirming procedures/surgeries, including hormone injection, breast augmentation, and other body contouring [9]. These physical remedies, coupled with low education and employment, can impact personal resources available for basic needs like food and transportation. As a result, transgender women often report significant levels of stress and lack of social support [10, 11], which are associated with a reduced likelihood to engage in health protective behaviors [11].

Given the high rate of HIV infection among transgender women in the US, it is important to identify interventions with the potential to reduce risk associated with HIV transmission and infection. Numerous HIV prevention efforts have been employed to combat the persistent rate of HIV infection in the US and the field of HIV prevention has experienced a recent shift that extends beyond behavioral risk reduction interventions to include biomedical interventions [12, 13]. A biomedical response to the HIV epidemic focuses on identifying undiagnosed HIV-positive persons in the early stages of disease, encouraging appropriate ongoing care, and promoting initiation and adherence to HIV treatment medication [14]. New prevention efforts also include pre- and post-exposure prophylaxis (PrEP and PEP) for high-risk HIV-negative persons [15, 16, 17]. However, promoting the uptake of protective behaviors, such as PrEP, PEP, risk reduction practices and linkage and adherence to HIV treatment among transgender women may be difficult, given the myriad structural barriers they may experience. In addition to the economic and social marginalization described above, transgender patients report stigma and discrimination in medical settings, including being refused medical treatment, being denied certain medications (i.e. hormones), or being treated with disrespect because their gender expression is different from their physiology [18].

While discrimination, stigma, stress, and social support are important, they do not fully account for the presumably high rate of HIV infection among transgender women. The current literature and reported experiences of transgender women underscores the necessity to explore how structural barriers (e.g., lack of transportation, lack of access to medical care and employment) are associated with transgender women's reporting of high-risk sexual behaviors, readiness to change HIV-related risk behavior, and verbal, physical and sexual abuse beyond the influence of more established risk factors like stigma and social support. The current study will examine these associations among a

sample of urban transgender women and we predict that structural barriers will be associated with an increased number of condomless anal sex partners and victimization, and decreased readiness to change HIV/STI-related risk behaviors. Understanding the role structural barriers play in increasing risk of HIV infection and transmission can inform HIV prevention efforts for this vulnerable and hard-to-reach population.

Methods

Participants and Procedures

From November 2007 to April 2008, Hunter College Center for HIV Educational Studies and Training (CHEST) in New York City in partnership with Hudson Pride Connections in Jersey City, New Jersey, recruited transgender women from various New York City venues including bars, house balls, community-based and AIDS service organizations, and street outreach for enrollment in an HIV risk-reduction intervention for transgender women [19]. Transgender women (persons born male who have identified as a female/transgender for a period of at least 3 months prior to enrollment), who reported (a) being 18 years or older, (b) oral or anal sex with a man in the last 3 months, (c) residence in the New York metropolitan region and (d) the ability to speak English and provide contact information and informed consent, were eligible for enrollment. Transgender women with serious mental health symptoms (as assessed using a brief psychiatric screener), or evidence of inability to read and/or comprehend English during the consent process were deemed ineligible for study participation. One hundred and seven transgender women were screened, of which 76 (71 %) were deemed eligible and 63 (83 %) agreed to participate. Participants were given \$40 for completion of each intervention session and study assessment. Data collection occurred at baseline and 3-months post-intervention and both assessments were conducted using an audio-computer assisted self-interview (ACASI) that lasted approximated 45–60 min. This study includes baseline data only. All study protocols were approved by the institutional review boards at CDC and Hunter College.

Measures

Sociodemographics

The ACASI assessed several sociodemographic characteristics including age, race/ethnicity, sexual orientation, education, income, HIV status and lifetime and recent (past 3 months) incarceration.

Structural Barriers

Participants responded to 6 selected items ($\alpha = .90$) from a life stress scale [20] that assessed difficulty accessing a number of resources. These 6 items were selected to represent stressors at the structural-level and include: “During the past three months, how often would you say that you have had problems with (a) transportation, (b) finding a safe place to hang out or sleep (housing), (c) food, (d) getting medical care, (e) getting a job, and (f) getting adequate clothing?” Response options ranged from 0 (never) to 3 (often). All scores were summed and higher scores indicate greater barriers to resources.

Readiness to Change HIV/STI-Related Risk Behavior

A 5-item response scale [21] was used to assess four behaviors: abstinence, mutual monogamy, safer sex/condom use, and silicone/hormone/drug injection (e.g., (1) I never think about using condoms, (2) I sometimes think about using condoms more often during sex, (3) I have decided to use condoms more often during sex, (4) I am already trying to use condoms more often during sex, (5) I am now using condoms all the time or I have always used condoms). All scores were summed and higher scores indicate greater readiness to change HIV/STI-related risk behavior.

Stress

Stress was assessed in this study using adaptations of the Gay-Related Stress Scale [22] (18 items; $\alpha = .90$) and the Stress-related Growth Scale [23, 24] (29 items; $\alpha = .92$). The Gay-Related Stress Scale was modified to become the Transgender Stress Scale by having participants indicate whether any of the events happened to them in the last 3 months because of their transgender identity. Example items include “Arguments with your parents about your transgender identity”, “Trouble with customer service (shopping, restaurants, clerks, etc.) because of your transgender identity”, and “Trouble with health care providers over your transgender identity”. Response options were 0 (no) or 1 (yes). The Stress-related Growth Scale was adapted for use with transgender women, and used to assess the extent to which participants believe they have experienced positive changes as a result of coming to terms with their identity as a transgender woman. Example items include “I learned to look at things in a more positive way”, “I learned to think more about the consequences of my actions”, and “I learned to be open to new information and ideas.” Response options were 1 (not at all), 2 (somewhat) or 3 (a great deal). For each scale, all scores were summed and higher scores indicate higher transgender-related stress or higher stress-related growth.

Stigma

Perceived transgender-related stigma was assessed using an adapted version of the HIV-related Stigma Scale [25] and stigma concealment was assessed using an adapted version of the Gay-related Stigma and Stigma Concealment Scale [26]. Perceived stigma was assessed using 10 items ($\alpha = .92$) and attempts to conceal transgender identity due to perceived stigma was assessed using 10 items ($\alpha = .84$). Response options ranged from 1 (strongly disagree) to 4 (strongly agree) to indicate the degree to which participants agreed to statements concerning perceived transgender-related stigma and attempts to conceal transgender identity. Example items for perceived transgender-related stigma include “When people learn you’re transgender they look for flaws in your character” and “People who know I’m transgender tend to ignore my good points.” Example items indicating attempts to conceal transgender identity include “I have told people close to me to keep the fact that I’m transgender a secret.” and “I never feel the need to hide the fact that I am transgender.” For each scale, all scores were summed and higher scores indicate higher perceived transgender-related stigma or higher concealment of transgender identity due to perceived stigma.

Social Support

The Multidimensional Scale of Perceived Social Support [27] is a 12-item scale ($\alpha = .93$) used to assess the degree to which participants agreed with statements concerning perceived social support including, “There is a special person around when I am in need” and “My family really tries to help me.” Response options ranged from 1 (very strongly disagree) to 7 (very strongly agree). All scores were summed and higher scores indicate higher perceived social support.

Victimization

Recent and lifetime victimization was assessed by using Pilkington and D’Augelli’s Victimization Scale [28]. Participants indicated how often they experienced verbal or emotional abuse (2 items; yelled at/criticized, threatened to expose transgender identity), physical abuse (7 items; e.g., punched, kicked, beaten, threatened with a weapon) or sexual abuse (1 item; forced to have a sexual experience/raped) because they were or were thought to be transgender. Participants indicated whether they had ever experienced these events (lifetime victimization; 10 items; $\alpha = .93$) or in the past 3 months (recent victimization; 10 items; $\alpha = .88$). Each victimization experience was coded 0 (No) or 1 (Yes) for lifetime and recent experiences separately. All items were summed for each scale, and

higher scores indicate higher lifetime or recent victimization experiences.

Risky Sexual Behavior

Participants were asked to indicate the number of main partners, casual partners, and trade partners (sex in exchange for drugs, food, or shelter) they engaged in condomless insertive or receptive anal sex in the last 3 months. Frequency across each partner type was summed, and higher scores indicate a higher number of partners engaged in condomless anal sex.

Data Analysis

Separate hierarchical linear multiple regression analyses [29] were conducted to test the association between structural barriers and [1] number of condomless anal sex partners, [2] lifetime victimization and [3] recent victimization, while controlling for demographics (age, education, income) known to be associated with these outcome variables [30]. A fourth and final hierarchical linear multiple regression analysis was also conducted to test the association between structural barriers and readiness to change HIV-related risk behavior, while controlling for demographics and other factors related to motivation to change risk behavior (stress, stigma, and social support).

Results

Descriptive

The mean age for this sample of 63 transgender women was 38.1 years ($SD = 10.7$) and women ranged in age from 18 to 59. The majority (81 %) of the participants self-identified as Hispanic (46 %) or non-Hispanic, African American (35 %). More than half (54 %) reported having completed high school or earning a general equivalency degree (G.E.D.); only 19 % reported full- or part-time employment; and 54 % reported an annual income of less than \$10,000. More than three-fourths (76 %) of this sample reported having ever been incarcerated with 21 % reporting having been incarcerated in the past 3 months. A majority (78 %) reported experiencing at least one structural barrier, including a lack of employment (48 %) and transportation (35 %). There was not a significant mean difference in structural barriers between HIV-negative ($M = 11.6$, $SD = 5.1$) and positive women ($M = 11.0$, $SD = 5.9$) (not shown in table). All transgender women in this sample reported experiencing verbal and sexual victimization in their lifetime, with a majority (87 %) reporting also experiencing lifetime physical victimization.

Two-thirds (68 %) of this sample of transgender women reported experiencing sexual victimization in the past 3 months. Thirty (48 %) women self-reported being HIV-negative and 33 (52 %) women reported being HIV-positive. Among all the sociodemographic characteristics described in Table 1, there were only two significant differences: HIV-negative transgender women were significantly older ($M = 34.7$, $SD = 11.9$) than HIV-positive transgender women ($M = 41.3$, $SD = 8.4$), $t(61) = 6.65$, $p = .01$ and HIV positive women reported significantly higher stress-related growth ($M = 78.6$, $SD = 8.2$) than HIV negative transgender women ($M = 72.5$, $SD = 9.3$), $t(61) = -2.75$, $p = .01$.

In the past 3 months, HIV-negative transgender women reported, on average, engaging in condomless anal sex with 2.4 ($SD = 5.2$) partners (main, casual, or trade partners). HIV positive transgender women reported, on average, engaging in condomless anal sex with 3.3 ($SD = 6.1$) partners in the past 3 months and this difference was not statistically significant, $t(60) = 3.33$, $p = .28$.

Multivariate Analyses

Using linear regression analyses, when controlling for demographics (age, education, income), experiencing structural barriers was significantly associated with increased lifetime victimization, ($B = 2.72$, $p = .0001$; Table 2), recent victimization ($B = .34$, $p = .0001$; Table 3), and increased numbers of male partners with whom participants had insertive or receptive condomless anal sex during the previous 3 months ($B = .51$, $p = .001$; Table 4). Whereas approximately 7 % of variance in lifetime and recent victimization was explained by demographic predictors, by adding structural barriers, an additional 21 % of variance in lifetime victimization ($p = .0001$) and an additional 41 % of variance in recent victimization ($p = .0001$) was explained. Adding structural barriers significantly improved the fit of the model predicting lifetime ($R^2 = .278$, $\Delta F = 15.96$, $p = .0001$) and recent ($R^2 = .474$, $\Delta F = 41.57$, $p = .0001$) victimization. Similarly, while only 1 % of the explained variance in number of condomless anal sex was attributed to demographic factors, adding structural barriers increased the fit of the model ($R^2 = .201$, $\Delta F(1, 52) = 12.39$, $p = .001$), providing an additional 19 % explained variance ($p = .001$).

When controlling for demographics and other related factors (stressors, stigma, and social support), experiencing structural barriers was significantly associated with decreased readiness to change HIV/STI-related risk behavior, $B = -.34$, $p = .01$ (Table 5). Whereas 21 % of variance in readiness to change HIV/STI-related risk behavior was explained by demographic and psychosocial

Table 1 Sociodemographic, psychosocial and sex behavior characteristics of a sample of transgender women, $N = 63$

Sociodemographic characteristics ^a	Total <i>N</i> (%)	HIV neg (N = 30) <i>N</i> (%)	HIV pos (N = 33) <i>N</i> (%)	X^2	<i>p</i>	
Age				6.45	.02	
18–29	16 (25)	12 (40)	4 (12)			
30–59	47 (75)	18 (60)	29 (88)			
Race				0.71	.87	
Hispanic	29 (46)	15 (50)	14 (42)			
African American, non-Hispanic	22 (35)	10 (33)	12 (36)			
White, non-Hispanic	4 (6)	2 (7)	2 (6)			
Other	8 (13)	3 (10)	5 (15)			
Education				0.17	.80	
Did not complete H.S./G.E.D.	29 (46)	13 (43)	16 (49)			
Completed H.S./G.E.D.	34 (54)	17 (57)	17 (51)			
Employed (part-time or full-time)	12 (19)	4 (13)	8 (24)	1.35	.34	
Income				0.95	.44	
<\$10,000	34 (54)	14 (47)	20 (61)			
≥\$10,000	26 (42)	14 (47)	12 (36)			
Incarceration						
Ever (lifetime)	48 (76)	22 (73)	26 (79)	0.26	.77	
Recent (past 3 months)	13 (21)	7 (23)	6 (18)	0.46	.53	
Structural barriers (any)	49 (78)	24 (80)	25 (76)	0.43	.67	
Lack of transportation	22 (35)	10 (33)	12 (36)			
Lack of food	15 (24)	6 (20)	9 (27)			
Lack of adequate housing	13 (21)	8 (27)	5 (15)			
Lack of adequate clothing	18 (29)	8 (27)	10 (30)			
Lack of employment	30 (48)	18 (60)	12 (36)			
Lack of adequate medical care	10 (16)	6 (20)	4 (12)			
<i>Psychosocial Risk Factors</i>						
Victimization (lifetime)						
Verbal	63 (100)	30 (100)	33 (100)	–	–	
Physical	55 (87)	28 (93)	27 (82)	0.88	.35	
Sexual	63 (100)	30 (100)	33 (100)	–	–	
Victimization (recent)						
Verbal	19 (30)	8 (27)	11 (33)	1.43	.32	
Physical	6 (10)	3 (10)	3 (9)	0.88	1.0	
Sexual	43 (68)	23 (77)	20 (61)	1.87	.19	
Psychosocial and sexual risk factors	Range	Total <i>M</i> (SD)	HIV neg. <i>M</i> (SD)	HIV pos <i>M</i> (SD)	<i>t</i>	<i>p</i>
Victimization (lifetime)	0–10	4.7 (3.1)	4.4 (3.0)	5.0 (3.3)	–0.80	.43
Verbal	0–2	1.3 (0.6)	1.3 (0.6)	1.3 (0.6)	–0.04	.97
Physical	0–7	3.0 (2.4)	2.7 (2.4)	3.2 (2.5)	–0.78	.44
Sexual	0–1	0.5 (0.5)	0.4 (0.5)	0.6 (0.5)	–1.12	.27
Victimization (recent)	0–10	2.5 (2.9)	2.5 (3.0)	2.5 (2.9)	0.02	.99
Verbal	0–2	1.3 (0.8)	1.1 (0.8)	1.4 (0.7)	–1.03	.32
Physical	0–7	4.7 (3.0)	6.3 (1.2)	3.5 (3.5)	1.51	.21
Sexual	0–1	0.4 (0.5)	0.5 (0.5)	0.3 (0.5)	0.81	.43
Readiness to change HIV/STI-risk behavior	4–20	12.8 (3.5)	12.4 (3.5)	13.2 (3.6)	–0.85	.40
Stress						
Perceived transgender-related stress	0–18	4.5 (4.6)	4.6 (4.2)	4.4 (5.0)	0.13	.89

Table 1 continued

Psychosocial and sexual risk factors	Range	Total <i>M</i> (<i>SD</i>)	HIV neg. <i>M</i> (<i>SD</i>)	HIV pos <i>M</i> (<i>SD</i>)	<i>t</i>	<i>p</i>
Stress-related growth	29–87	75.7 (9.2)	72.5 (9.3)	78.6 (8.2)	−2.74	.01
Stigma						
Perceived transgender-related stigma	10–40	23.3 (7.5)	24.8 (6.5)	22.0 (8.2)	1.50	.14
Transgender-related stigma concealment	10–40	26.9 (6.1)	28.4 (5.0)	25.5 (6.7)	1.95	.06
Perceived social support	12–84	59.3 (17.1)	55.9 (16.2)	62.3 (17.5)	−1.49	.14
Number of male partners, condomless anal sex ^b	0–27	2.8 (5.6)	2.4 (5.2)	3.3 (6.1)	−1.12	.27

^a Group frequency and mean differences were examined and, with the exception of age, group differences were not observed and are not shown here

^b Excludes outlier reporting 180 condomless anal sex partners

Table 2 Hierarchical linear multiple regression predicting lifetime victimization experiences among HIV-negative and positive transgender women, *N* = 63

Predictor variable	<i>B</i>	<i>p</i>	<i>R</i> ²	ΔR^2	ΔF	<i>p</i>
Step 1						
Age	0.07	.01	.065	.065	1.28	.29
Education	0.63	.78				
Income	0.19	.31				
Step 2						
Structural barriers	2.72	.0001	.278	.213	15.96	.0001

Table 3 Hierarchical linear multiple regression predicting recent victimization experiences among HIV-negative and positive transgender women, *N* = 63

Predictor variable	<i>B</i>	<i>p</i>	<i>R</i> ²	ΔR^2	ΔF	<i>p</i>
Step 1						
Age	.39	.17	.068	.068	1.35	.27
Education	.97	.11				
Income	.31	.61				
Step 2						
Structural barriers	.34	.0001	.474	.405	41.57	.0001

Table 4 Hierarchical linear multiple regression predicting number of condomless anal sex partners among HIV-negative and positive transgender women, *N* = 63

Predictor variable	<i>B</i>	<i>p</i>	<i>R</i> ²	ΔR^2	ΔF	<i>p</i>
Step 1						
Age	0.03	.69	.011	−.045	0.20	.90
Education	0.43	.77				
Income	0.77	.61				
Step 2						
Structural barriers	0.51	.001	.201	.190	12.39	.001

predictors (*p* = .07), by adding structural barriers, an additional 10 % of variance in readiness to change HIV/STI-related risk behavior (*p* = .01) was explained. Adding structural barriers significantly improved the fit of the model predicting readiness to change HIV/STI-related risk behavior, *R*² = .308, $\Delta F(1, 44)$ = 6.50, *p* = .01.

Discussion

This group of transgender women experienced a great deal of victimization and encountered a number of structural barriers including unemployment and lack of transportation which supports previous findings including a 2008 meta-analysis of 29 studies on the HIV prevalence and risk behaviors of transgender individuals in the US [2]. However, as noted in their meta-analysis, Herbst et al. [2] state that although the review identified individual-, interpersonal- and structural-level factors commonly experienced by transgender persons, few studies tested how these factors are specifically associated with HIV-related risk behaviors and HIV serostatus.

In the current study, experiencing structural barriers was not only significantly associated with increased recent and lifetime victimization, experiencing structural barriers was also significantly associated with increased numbers of male partners with whom participants had insertive or receptive condomless anal sex during the previous 3 months, including exchange sex partners. Previous research [2] on transgender women indicate that a lack of employment opportunities may lead transgender women to engage in sex work. Furthermore, sex work may often lead to incarceration and both sex work and incarceration are risk factors for HIV infection [31].

With the exception that HIV-positive transgender women were, on average, 6.6 years older than the HIV-negative transgender women enrolled in this study and HIV

Table 5 Hierarchical linear multiple regression predicting readiness to change HIV/STI-related risk behavior among HIV-negative and positive transgender women, $N = 63$

Predictor variable	<i>B</i>	<i>p</i>	R^2	ΔR^2	ΔF	<i>p</i>
Step 1						
Age	.06	.22	.071	.071	1.28	.29
Education	-.26	.79				
Income	-.60	.55				
Step 2						
Transgender-related stress	.04	.80	.101	.030	0.80	.46
Stress-related growth	.11	.06				
Step 3						
Perceived transgender-related stigma	-.04	.73	.146	.045	1.22	.31
Transgender-related stigma concealment	.22	.02				
Step 4						
Perceived social support	-.07	.07	.206	.059	3.36	.07
Step 5						
Structural barriers	-.34	.01	.308	.102	6.50	.01

positive women reported higher stress-related growth, both groups were similar with respect to race, education, income, employment, victimization and experiences with structural barriers, stress, stigma, social support, number of condomless anal sex partners, and readiness to change HIV-related risk behaviors. Furthermore, HIV-positive and HIV-negative transgender women of color in this study experienced similar structural barriers that may impact HIV-related risk. While it would be informative to include details about how this sample is similar to or different from a predominantly non-ethnic minority sample, we were not able to find any literature that compares HIV positive and negative, non-ethnic minority transgender women on structural factors and sexual risk/victimization. However, Nuttbrock et al. [32] did report findings on a study of 517 black, Hispanic, and non-Hispanic white, HIV positive and negative, male-to-female transgender women. Compared to their study's HIV prevalence rate for black (48.1 %) and Hispanic (49.6 %) transgender women, HIV prevalence for non-Hispanic white transgender women was low (3.5 %). While this low rate of infection prevented examination of the effects of structural and psychosocial risk factors on HIV infection within this group and between the other racial/ethnic groups, non-Hispanic white transgender women reported fewer exchange and lifetime casual sex partners, less lifetime unemployment and less physical and psychological abuse when compared to black and Hispanic transgender women. Similar to our study, number of lifetime exchange sex partners and lifetime unemployment was associated with HIV infection among black and Hispanic transgender women [32].

HIV-positive and negative transgender women in the current study reported having, on average, approximately 2–3 partners with whom they engaged in condomless anal sex. Although this study did not qualitatively or directly

assess potential reasons why women engaged in risk behavior, the findings suggest that structural barriers like limited resources may be implicated in this risk. In addition to prevention programming that addresses the importance of condom use and reducing the number of condomless anal sex partners, educational, social and biomedical interventions for transgender women might consider structural barriers that may impede the enactment of preventative behaviors. Although by some accounts, the rate of HIV transmission among transgender individuals is greater than that for MSM and partners of PLWH [3], currently little is known about evidence-based HIV interventions for transgender women that target behavior change.

In this study, the majority (78 %) of transgender women reported experiencing one or more structural barriers (i.e. access to food, transportation, housing, employment, clothing and medical care). Beyond the variance explained by demographics, social support, and transgender related stress and stigma, structural barriers explained an additional 10 % of the variance observed in HIV-positive and negative transgender women's readiness to change HIV/STI-related risk behaviors. These findings suggest that interventions for reducing HIV infection and transmission among transgender women should address structural barriers like food insecurity, housing instability, a lack of transportation, unemployment, and inadequate medical care. In New York City, for example, providing free metro cards are a standard incentive for participation in HIV prevention and treatment activities sponsored by community-based and AIDS-serving organizations as they often increase program attendance [33, 34]. Further research is needed to determine if providing tangible resources, like free transportation, directly impacts risk-reduction behavior.

It is important to note that biomedical and other prevention modalities may fail because individuals may not

prioritize sexual health when experiencing demands to meet basic needs like food, clothing, shelter and employment. Ethnic minority HIV-negative and positive transgender women may need structural-level interventions that attend to these needs prior to or in concert with HIV risk-reduction education and programming that targets reducing transmission and infection, including linkage to and retention in care and treatment. In a recent study on characteristics of transgender women living with HIV receiving medical care in the US, Mizuno and colleagues [35] found no differences between HIV-positive transgender women and non-transgender men and women with respect to the percentages prescribed ART. However, significantly fewer transgender women had 100 % ART dose adherence and durable viral suppression when compared to non-transgender men. Furthermore, compared to non-transgender men, significantly higher proportions of transgender women required supportive services and higher proportions of transgender women reported higher unmet needs for services like food, housing and transportation. Lack of transportation directly affects access to care for HIV-positive transgender women including the ability to make and keep medical appointments. Hence, structural barriers like lack of transportation can indirectly affect medication adherence, individual- and community-level viral load suppression, morbidity, mortality and other health outcomes [36, 37]. Given other structural-level barriers like discrimination against transgender persons in medical settings and the lack of adequate knowledge among providers to care for transgender patients [38], training is needed to increase the cultural competency of providers to improve patient-provider interactions among HIV-negative and positive transgender women.

In addition to discrimination within medical settings, comprehensive HIV prevention efforts require considering the discrimination, stigmatization, and social marginalization [10, 39] transgender women experience with respect to employment and housing. Across studies [2], transgender women report high levels of unemployment (23 %) and job discrimination (35.3 %). Additionally, young transgender women who experience familial rejection might subsequently find themselves homeless [20, 40]. Depending on the age at which transgender youth are ejected from the home, they may miss opportunities to gain job skills which may have negative effects on employment history, financial stability, and consequentially, increased risk for engaging in risky sex for food, money, or shelter [40]. A better understanding of potential pathways leading to HIV risk behaviors for transgender women is needed to develop tailored interventions for different developmental stages experienced by this group.

Other suggestions for HIV risk-reduction programming include addressing the perceived stigma and experience of

discrimination as well as gender affirming interventions, particularly targeted to transgender women of color which promote gender confirmation. Such interventions may help transgender women gain greater acceptance of themselves while reducing the need for personal affirmation in unhealthy sexual relationships. One approach to addressing issues experienced by transgender women is the *Girlfriends* intervention [19] which focuses on transgender stress, stigma and risks, substance use, personal growth and social support. Developed for HIV-negative and positive transgender women, the *Girlfriends* intervention has shown promising results in reducing sexual risk behaviors among transgender women [19].

Limitations

Although this study identified important structural factors associated with abuse, sexual risk and readiness to reduce sexual risk among ethnic minority transgender women, a few methodological limitations should be considered. Access to STI testing (rectal, urethral and pharyngeal) as a structural barrier was not assessed in this study and should be considered in future research with this population. Also, the analyses were conducted cross-sectionally; therefore, causal interpretations cannot be made. The data on abuse, sexual behavior, and attitudes rely on retrospective self-report data, hence, it is possible that participants had difficulty recalling important information, and/or they provided a socially desirable response to the sensitive questions. However, use of the ACASI can reduce socially desirable responses and increase the likelihood of more honest responding. Moreover, given the small sample size, it is possible that the moderate effect sizes observed in this study actually underestimate the associations between structural barriers and individual risk for HIV infection and transmission. Also, given the small sample size and convenience sample, the results are not generalizable to all HIV-negative or positive male-to-female transgender women. Further research with a larger sample size and diverse geographic populations may be needed.

Conclusions

This study found that, regardless of serostatus, transgender women, particularly transgender women of color, experience various structural barriers and these barriers were associated with various HIV-related risk behaviors and experiences. Furthermore, the efforts of transgender women to remain HIV-negative may be complicated and potentially difficult to sustain in instances where they experience barriers to HIV-risk reduction. HIV prevention

education and treatment is paramount. However, addressing structural barriers, like stigma and discrimination, lack of transportation, unemployment, and basic needs like food and shelter, may be essential to improve readiness to change risk behavior.

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